Claims

1. Method of making a wear-resistant spinning rotor cup comprising forming a hard coating on an interior surface of an incipient spinning rotor cup by (i) immersing said incipient spinning rotor in an electrolytic bath comprising a passivating agent and an electrolytic agent, and (ii) passing a modified shaped-wave alternating electric current from a source of 250 to 800 volts through said interior surface of said incipient spinning rotor, wherein said modified shaped-wave electric current rises from zero to its maximum height and falls to below 40% of its maximum height within less than a quarter of a full alternating cycle thereby causing dielectric breakdown and the formation of a ceramic coating on said interior surface, and removing said incipient spinning rotor cup from said electrolytic bath.
2. Method of claim 1 wherein said current is passed through an electrode positioned within said incipient spinning rotor cup to cause said formation of a ceramic coating on at least one selected portion of said interior surface.
3. Method of claim 2 wherein said electrode has a peripheral terminus and is positioned centrally within said incipient spinning rotor cup so that said terminus is peripherally substantially equidistant from said at least one selected portion of said interior surface of said incipient spinning rotor cup.
4. Method of claim 1 wherein said passivating agent comprises a colloidal silicate.
5. Method of claim 1 wherein said electrolytic agent comprises an alkali metal hydroxide.
6. Method of claim 1 wherein said incipient spinning rotor cup has an aluminum surface.

7. Method of claim 1 wherein said passivating agent is a colloidal suspension of sodium silicate in the form $Na_2O \cdot xSiO_2$ (x=>2.55 by weight) at a concentration of 2.0-9.5 grams per liter of said bath, said electrolytic agent is an alkali metal hydroxide, said spinning rotor cup has an aluminum surface.

8. Method of forming a hard ceramic surface on a selected portion of the internal annular surface of a spinning rotor cup comprising (a) placing said spinning rotor cup in an electrolyte bath containing ingredients capable of forming a hard ceramic surface by electrolysis (b) connecting said spinning rotor cup to a source of electric current (c) placing an electrode inside said spinning rotor cup, said electrode being shaped and placed to provide a peripheral terminus substantially peripherally equidistant from said selected portion of internal annular surface, and (d) passing a current through said electrode, said bath, and said rotor sufficient to form a hard ceramic coating on the surface of said selected internal annular surface.

9. Method of claim 8 wherein said selected internal annular surface comprises the surface of a collection groove.

10. Method of claim 8 wherein said electrode comprises a body and a downwardly oriented peripheral flange.

11. Method of claim 8 wherein said current is a modified shaped-wave alternating current.

12. Method of claim 8 wherein said incipient spinning rotor cup has an aluminum surface.

13. Method of claim 8 wherein said electrolytic agent is an alkali metal hydroxide present in a concentration of 0.5 to 2 grams/liter.

14. Method of claim 8 wherein said passivating agent comprises about 2 to about 15 grams per liter of sodium silicate of the formula $Na_2O{\cdot}xSiO_2$ (x=>2.55 by weight).

15. A spinning rotor cup made by the method of claim 1.

16. A spinning rotor cup made by the method of claim 8.

17. A spinning rotor cup having a surface hardness of greater than 1000 Kn_{100}.

18. A spinning rotor cup of claim 17 having a hardness of at least 1300 $Kn_{100.}$

19. A spinning rotor cup of claim 17 having a body selected from aluminum, titanium, magnesium, beryllium, hafnium, zirconium, or alloys thereof.

20. An electrode useful in forming a hard ceramic coating on a spinning rotor cup comprising a terminal for connection to an electric circuit, and a substantially circular, downwardly projecting peripheral terminus.